

Testimony of Stephen Tolbert
President and CEO of Global Systems & Strategies, Inc. (GSS)
Subcommittee on Science, Technology, and Space
Senate Committee on Commerce, Science, and Transportation
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Chairman Frist:

My name is Steve Tolbert and I am the president of Global Systems & Strategies, Inc., (GSS) a small, fast-growing network architecture design firm in the mid-Atlantic region. My company provides high-end network engineering consulting services to a variety of private sector clients as well as Government agencies such as HCFA, DoD, and FDA. I am also a member of the Northern Virginia Technology Council (NVTC) board of directors and executive committee, and as such, am the founder and chair of NVTC's Telemedicine Working Group. In speaking here today, I represent the perspective of my firm, as both a consumer and designer of internet services, as well as that of the NVTC Telemedicine Working Group.

Our society's dependence on information technology and the internet services that glue us all together is growing at a staggering rate. Every day, more businesses, more federal, state, and local government agencies, and more individuals jump to new internet-based services and technologies as a way of getting just about anything done. To appreciate our increasing dependency on technology, we need only to look back 60 days at the Y2K scare. America's public and private sector businesses stopped forward progress on many fronts and spent billions of dollars vaccinating themselves against the Y2K bug. Families across the country even built bunkers stocked with months of supplies, certain that society would grind to a halt with crippled technology. We are squarely in the midst of the information age and our way of life depends on how we embrace this new order.

The internet is at the center of this dramatic trend. It has become the connecting fabric of today's modern business and even today's modern family. We hand out e-mail addresses as readily as we hand out phone numbers. From Fortune 100 businesses to local, family-owned produce farms, almost every business uses information technology and the internet in some capacity.

Today, however, the internet is at an interesting cross-roads. Based partly on twenty-year old technology, the internet's capacity and capabilities are being exhausted by our amazing ability to think up new ways to use it. It is becoming a victim of its own success. Today's internet will not support tomorrow's demands – we must begin implementing the Next Generation Internet (NGI) now to protect our current rate of progress and our global leadership.

For example, we are fast depleting available, unique addresses on the current internet. While work-arounds are available that may extend current addressing schemes, they compromise other key features and only solve the problem for particular uses of the internet. The address space offered by NGI could provide up to 32 unique addresses for every square inch of dry land on the planet – not terribly useful, but a clear indication that we would not be facing this problem again for generations.

Other problems relate to the current technology's inability to adequately support new uses such as transmission of high-speed, real-time multi-media images like complex medical images or full-screen, full-motion video conferencing. A single MRI image can include up to 20 gigabytes of information, which, over a standard dial-up internet connection, would take roughly 38 days to transmit. If you're fortunate enough to have access to a "high-speed" T-1 connection, it would still take more than 30 hours. A typical connection to NGI would move this image in 30 seconds.

Finally, our national telecommunications infrastructure does not provide adequate access to today's internet. While most regions have telephone access and therefore, low-speed access to the internet, many rural areas do not have higher speed services critical for applications such as telemedicine. Again, consider transmission of medical images, even less complex x-rays. Support for full-screen, full-motion video conferencing between remote patients and physicians or specialists requires 3 – 6 times the speed of a standard telephone line. Rural access to NGI could support such services as life-like video conferencing and real-time transmission of medical images (including full-motion images such as ultrasound.) These advances would not only change the cost of rural health care -- they would save lives.

The Next Generation Internet and its supporting technologies can solve many current obstacles and truly enable the next generation of information technology. For example, NGI supports high-speed multi-media transmission, including voice over IP, enhanced security, vastly increased addressing, and more robust fault resistance. But, while many of the specific technologies needed have been developed by various public and private consortia and research organizations, there is still substantial work ahead to make NGI a viable, national solution.

Additional research in high-speed, high-availability network technologies is needed to produce the next wave of higher speed, yet inexpensive network equipment and software. Specifically, research is needed to support affordable, higher-speed rural access with technologies such as wireless and satellite communications. There is also much work to be done planning the transition to NGI. The process of migrating the nation's pervasive internet technology to a new generation of technologies is non-trivial, and by some estimates, may cost up to \$100 Billion. I would argue,

however, that the alternative of an exhausted internet would cost more through lost revenue, lost competitive edge, and the inability to deliver needed services.

If we agree that the reasons to move to NGI are clear and compelling, then the remaining question becomes, “why should the federal government dedicate substantial funds to the issue?” Why won’t natural market forces compel the high-technology industry to develop and deploy NGI?

I would argue that substantial progress on specific fronts by private industry is probably inevitable. However, I would also argue that the development of a coherent, more capable national telecommunications infrastructure that, at the same time treats both rural, individual access and urban, Fortune 100 access in the timeframes needed before the current internet becomes a barrier, is unlikely without additional motivation and focus.

For example, without directed research, few companies would make near-term investments in high-speed rural access – the economics simply don’t support it. In this case, there is a divergence between the national interest on the one hand and the competitive interests and pressures of the private sector on the other. As I stated earlier, to ignore the rural access issue could cost lives. Motivated by federal support, industry could develop and deploy technologies that, in providing lower cost rural access, could improve availability of quality health care and help to narrow the digital divide.

Federal investment and coordination would also provide two other fundamental benefits. It would certainly accelerate progress towards a faster, more robust national telecommunications infrastructure. Furthermore, it would serve to homogenize the diverse efforts of those involved, leading to national technical standards and avoiding the delays introduced by competing, proprietary technologies.

Other dividends produced by this investment would include the following:

- Achieving a faster and more robust national telecommunications infrastructure would support additional economic growth, not just in the high technology industry, but across every industry that could benefit from universal access to fast, reliable communications. There is clear precedence in the dividends produced by investments in the technology sector, a sector that accounted for roughly 1/3 of the economy’s growth between 1995 and 1998.
- This country has enjoyed global competitive leadership that in fact began with similar investments in infrastructure that fueled the industrial revolution 100 years ago. Accelerating the deployment of a more capable telecommunications infrastructure would help to sustain this leadership. Business to business relationships and collaboration among research and educational institutions

would be enhanced.

- Often overlooked in discussions about advanced technology investments, the social impact of an improved national telecommunications infrastructure would be profound. The impact on the delivery and access to timely, high-quality health care services alone could improve quality of life across the country.
- Finally, the government itself is a substantial consumer of telecommunications services and would benefit directly from accelerated deployment of a faster, more secure telecommunications infrastructure, though, admittedly, this would be initially tempered by the government's own transition costs.

In conclusion, I strongly support the changes to the Next Generation Internet Act under consideration by this subcommittee.

Thank you for allowing me the opportunity to speak to you today about this compelling and timely issue.

Stephen M. Tolbert
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Global Systems & Strategies, Inc. (GSS)

Mr. Tolbert is President and CEO of Global Systems & Strategies, Inc. (GSS). Since taking over management of the company in 1995, Mr. Tolbert has successfully transitioned the firm from a small consulting practice to a fast-growing, multi-million dollar information technology (IT) solution provider with an outstanding track record of successful government and private sector contracts.

Before coming to GSS in 1992, Mr. Tolbert worked as a senior engineer for Federal Data Corporation, Zenith, and Honeywell. He earned his Bachelor's degree in Computer Science at the University of Maryland and has performed over 17 years of systems engineering and program management for a wide range of Government and commercial high technology projects.

His accomplishments include the design and development of several successful computers and peripherals and the design of a variety of complex, distributed information system architectures.

As a systems engineering expert, he has conducted systems engineering training, developed a formal technology evaluation methodology currently in use by the Government, and has led the development of many successful Government proposals for over \$2 billion in contract awards. He has also been a featured speaker at regional events on a variety of technical and business subjects and is a certified Quality Instructor. Mr. Tolbert currently serves on the Northern Virginia Technology Council (NVTC) board of directors and executive committee and founded and chairs the NVTC Telemedicine Working Group.

Global Systems & Strategies, Inc. (GSS)

GSS is an employee owned Information Technology (IT) solutions provider with principal offices located in Tysons Corner, Virginia. GSS designs and integrates IT and network solutions to meet the business needs of government and commercial clients. GSS designs, develops, implements, and manages complex enterprise-wide information systems – systems that meet both long and short term requirements.

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